

Principles of Epidemiology
Skyline Health & Medicine
A Deadly Virus From The Rain Forest



In September 1976 an outbreak occurred on the other side of the world. In northern Zaire (since renamed the Democratic Republic of Congo), a country in central Africa, a young man received an injection of medicine at the small Yambuku Mission Hospital. The village of Yambuku is in the Bumba Zone, an area of rain forests near the Ebola River. Local people suffering from malaria would come to the hospital in Yambuku to get shots of medicine to ease their chills and pains. Because the hospital staff had little money to buy supplies, they used the same few unsterilized needles to inject hundreds of patients.



A couple of days after the young man, who taught at the local school, received his injection, he became ill again. First, he had a headache. Then he began to sweat from a fever, and the joints of his arms and legs ached. As the days passed, he rapidly grew sicker. A rash appeared on his face and then all over his body. He began to shake and tremble. The red spots on his body turned to large blotches and then bruises. The teacher's skin became soft and pulpy, and chunks of it fell off his body. Blood oozed from his mouth and he vomited a black, slippery substance. His insides were being turned into a slimy jelly. Blood flowed from his eyes as he went into a seizure. His body twitched, and his arms and legs thrashed. After three days, he died. He was the first victim of one of the deadliest diseases in the world –Ebola hemorrhagic fever.



Shortly after the teacher's death, thirteen of the seventeen staff workers at the hospital died in the same way. One of the nuns who had treated the teacher flew to Kinshasa, the capital of Zaire, to seek a cure. But the doctors at Ngaliema Hospital in Kinshasa could not help her, and she also died.

The young nurse at the hospital that had been caring for the nun when the nun died was named Mayinga. She tried to protect herself from the disease

by wearing gloves and a facemask, but she could not avoid contact with the nun's blood. Soon Mayinga, too, began to feel ill. But she ignored her illness and went to take care of some business at a government office, where she stood in line with hundreds of people. While waiting, she shared a bottled soft drink with a stranger. The next day, Mayinga was feeling worse. She went to Kinshasa's largest hospital, the Mama Yemo Hospital. The doctors told her she was not very sick and sent her back to Ngaliema Hospital. At the same time, rumors began to circulate throughout the city about a deadly new disease coming out of the Bumba Zone.

When people at Ngaliema Hospital realized that Mayinga had this new disease, they panicked. They alerted government officials, who became immediately alarmed. Kinshasa is a large city, whose population at that time numbered more than two million people, with direct links by air to other cities around the world. This disease was fatal, contagious – and without a cure. It would be a disaster if it spread.



Mobutu Sese Seko, who was then president of Zaire, sent in his army to seal off the infected areas. Soldiers surrounded the Ngaliema Hospital. No one could enter or leave. All roads in the Bumba Zone were blocked. No one was allowed in or out. The World Health Organization was also alerted (WHO).

The doctors at Ngaliema Hospital drew samples of Mayinga's blood. Scientists would examine her blood to try to find and identify the mysterious germ that was killing her. The blood was placed in tightly sealed containers and carefully packed. The delicate, deadly cargo was flown to laboratories in Great Britain, Belgium and the United States. In the United States, the blood was sent to the CDC.

Meanwhile, an international team of epidemiologists headed to Africa. These men and women would search for everyone who had had contact with the Ebola victims. They would probe into the headwaters of the Ebola River looking for the source of the disease. The epidemiologists suspected that the disease was caused by filovirus, a type of virus that looks like a twisting, looping string. Filoviruses appear to be far more dangerous than other types of viruses.

At the CDC, Dr. Patricia Webb and her husband, Dr. Karl M. Johnson, head of the CDC's Special Pathogens Branch, compared the blood taken from Mayinga with the inventory of blood samples stored at the CDC. Working in a tightly sealed Level 4 Laboratory, the scientists identified the virus. This was a new strain, similar to the Ebola virus that had appeared in Sudan, Africa, and a few months earlier – though that virus had not been nearly as speedy or deadly a killer. The new strain also resembled the Marburg virus, which had also originated in Africa. Dr. Johnson named the new strain the Zaire strain of the Ebola virus.

Immediately, Dr. Johnson and a team from the CDC were dispatched to Zaire to battle the disease. Meanwhile, the international team of epidemiologists in Kinshasa was locating all persons who had had contact with Mayinga. 35 people of those how had seen here outside the hospital, including the boy who shared a soft drink from the same bottle, were ill and died. Mayinga died too.

In the Bumba Zone, tribal elders put in a place a technique they had used over the years to combat other contagious diseases. They separated the sick people from the healthy – a form of quarantine. Villages who became ill were confined to a hut. No well person could go near them. If the victims survived, that was fine. If they did not survive, there were left in the hut and the hut and the bodies were burned. By doing this, the villagers were able to stop the spread of Ebola. Two months later, the virus retreated back into the rain forest as mysteriously as it had appeared. The scientists who searched for the source of Ebola did not find it. Since then several outbreaks have occurred in sub-Saharan Africa, one as recently as 2008 in Uganda. This latest outbreak appears to be a new strain of the virus, the source of which remains unknown.

A similar filovirus was eventually discovered in laboratory monkeys at Hazelton Laboratories in Reston, Virginia. Immediately, the U.S. Army Medical Research Institute of Infectious Diseases (USAMRIID) was called in to quarantine the area and destroy the infected monkeys. Officials tracked everyone who had had contact with the infected monkeys.

Apparently, this strain of the virus, the Reston strain, is not harmful to humans. This is very fortunate, because in densely populated areas, viruses can trigger a massive and deadly outbreak. Since the discovery of the

Reston strain in 1989, periodic outbreaks have occurred in various parts of the world. The most recent cases among monkeys were in 1996 in the United States and in the Philippines, and no human infections were reported.